

Ayden Chubbic

UAS enthusiast

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I am a new grad from UCSC with a passion for drones and other autonomous systems! I have a Bachelors in computer science and a good attitude. Between my organizational roles with FlyBy (below) and my technical work with my lab I'm ready to contribute to any team you put me on!

RELEVANT EXPERIENCE

FlyBy (C++, Python, Agile)

Social Emotional Technologies lab / Santa Cruz, CA / Jan 2020 - Present

FlyBy is a drone delivery service I started with my friend to deliver food to immuno-vulnerable peoples during this pandemic. We work with non-profits to get supplies to seniors and (recently) protesters. My responsibilities can be generalized as follows:

- **Design:** I build and program our drones. The Navio2 controllers we use have a built-in autopilot, but it is insufficient for navigating urban environments and landing safely when obstacles like parked cars are present. I designed a landing function that uses computer vision to land closest to homes while avoiding hazards.
- **Outreach:** Connecting with local food banks and community centres and scheduling volunteer shifts. I also reach out to organizations and university resources for funding as drones are expensive and we do not charge the charities we work with.
- **Teambuilding:** What did we accomplish last week? What is everyone working on now? What are our individual future goals? Four people do not require a *ton* of oversight, but I am often the one organizing zoom meetings and setting the teams direction for the next week.

Undergraduate Research Assistant (C++, Golang)

UCSC ASL lab / Santa Cruz, CA / Jan 2019-Dec 2019

- Contributed to a TensorFlow library which used machine learning algorithms to allow "flocks" of drones to relay changes in wind, pressure, etc. to nearby drones, allowing them to adjust their flight path accordingly.
- The improvements produced 6% improved power consumption and allowed receiving drones to reach their destination faster and more reliably without being blown off course.
- My scripts throttled the flight controller's multithreading to improve response times in lead drones. I used C++ and Golang.

AREAS OF EXPERTISE

Computer Vision
Robotics
Data Analysis
Machine Learning
Distributed Systems
Sensors

DESIGN METHODS

Agile development
SCRUMs
Unit Testing
User Research
Prototyping
Usability testing

COMMUNITY INVOLVEMENT

Discovery Preschool
(2015-present)
Second Harvest
(2016-present)
Kiwanis
(2013-2019)
HourOfCode
(2014-2017)

CONTACT

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TECHNICAL SKILLS

C++, PyTorch, ROS, Golang,
Python, TensorFlow, OpenCV,
ArduPilot, DroneKit, Python,
React, Flask, Numpy, Firebase,
PostgreSQL, Matlab, Dronekit

INTERPERSONAL SKILLS

Communication, Collaboration,
Prototyping, Interviews,
Surveys, Usability Testing,
Storyboarding, Contextual
Inquiry

EDUCATION

Computer Science (BSc), UCSC
Relevant Coursework: Computational
Statistics, **Distributed Systems**
Tutoring: Distributed Systems, Discrete
Mathematics

PROJECTS OF INTEREST

UAV Landing Protocol: • ROS • OpenCV

I trained a Haar cascade to identify empty patches of sidewalk for a project that required drones to land in suburban areas. Images from a landing drone's camera are taken and extruded to account for linear distortion. Once a plot of suitable land is identified, ROS estimates the distance to the plot and updates the autopilot's target coordinates.

IMU Visualization: Arduino • Sensors • C++

I built a module that allows UAV pilots to visualize the orientation of their drone remotely. The IMU passes gyroscopic data to the Arduino serving as a flight controller which is then sent back to my laptop. Processing then takes the yaw, pitch, and roll and displays the data as a human-readable 3D figure. Very convenient for flights where you do not always have line of sight

ASL STEM dictionary: Full-stack • Databases

A common problem facing the auditorily impaired community is that there is no standardized vernacular for technical language. As part of a partnership with the University of Washington, my team and I developed a community-sourced platform on which colloquial STEM terms and be recorded and uploaded by deaf experts in their respective fields. My contributions involved work using React, FireBase, and Vue. Check it out!: <https://aslstem.web.app/>

StarCraft AI: Pathfinding • algorithms • Golang

Designed a pathfinding algorithm that would determine the most efficient path for a unit to take in a game of StarCraft 2. The algorithm accounts for the movements of surrounding units and adjusts its path accordingly. In situations where a group of units must walk through a tight corridor, it is an improvement to the pathfinding used by the game engine.

Donald Who? • Machine learning • Arduino • C • TensorFlow

Tired of politics? No problem! As TreeHacks contestants, my team and I built an Arduino module that replaces the voice of the celebrity of your choice with that of Kermit the Frog. A TensorFlow process scrapes news outlets for clips of the target politicians voice and uses the audio to train a neural network. An Arduino attached to the TV's sound card sends preprocessed audio to your local machine which compares incoming data to the target voice. If the voices match, the Arduino returns an overwrite code to the sound card, replacing the desired voice with everybody's favourite muppet!

HTTP Server • Networks • C

Built a multithreaded HTTP server from scratch using only the Socket and File Manipulator libraries of C. The server is fully synchronized to prevent clients from overwriting the same memory at the same time. The server has 16 ports, but can emulate additional ports by putting client processes to sleep and then working on another client's request. Should this happen, the server handles requests and gives them priority based on which is least likely to cause deadlock.